Available online at https://www.mmpubl.com/ijpedorehab

International Journal of Pedodontic Rehabilitation

Original Research

Comparison of the efficacy of two different rotary files in pediatric dentistry

Akshata S H[1], Priya Nagar[2], Maithili Kulkarn[3], Sanjana Devi[4]

[2]Professor & HOD, Department of Pedodontics and Preventive Dentistry, Krishnadevaraya College of Dental Sciences, Karnataka

[1,3,4]P G Student, Department of Pedodontics and Preventive Dentistry, Krishnadevaraya College of Dental Sciences, Karnataka

How to cite: Akshata et al, Comparison of the efficacy of two different rotary files in pediatric dentistry. Int J Pedo Rehab 2024; 9(2):62-75

DOI: https://doi.org/10.56501/intjpedorehab.v9i2.1192

Received 5/12/2024 *Accepted: 10/1/2025* *Web Published: 20/1/2025*

ABSTRACT

Background: Rotary file systems for canal instrumentation in primary teeth are a recent advancement in pediatric dentistry. As the field evolves, understanding the effectiveness of different pediatric rotary file systems is essential.

Aim: To assess and compare the effectiveness of obturation and instrumentation time for primary molars invivo after cleaning and shaping with two distinct pediatric rotary files and a manual hand filing technique used in pediatric dentistry. Also, to evaluate and compare the 3D shape of intercanal spaces, surface roughness, and debris index of primary canines invitro.

Methods: A total of 9 extracted primary canines (invitro) and 15 primary molars (invivo) were taken for the study. These subjects were divided into 3 groups. Group 1 - kids-e-dental rainbow files, group 2 - Kedo SG blue files and group 3 – hand files. In invitro study, canal internal 3D shape was determined by intracanal impressions. Stereoscope images of set of sectioned teeth were used to evaluate smoothness and debris index of prepared canals. In invivo study, instrumentation timing was recorded and Obturation quality was assessed using radiographs. All data were recorded and statistical analysis was done.

Results: A significant difference ($P < 0.001$) was observed in qualitative assessment of debris scores, and smoothness analysis as well as in obturation quality among three groups. A statistically significant difference ($P < 0.05$) was noted in instrumentation time among groups.

Conclusion: There was a significant difference in instrumentation time and qualitative assessment among three groups.

Keywords: *Rotary endodontics, pulpectomy, obturation quality, canal taper.*

Address for Correspondence:

Dr. Akshata S H, P G student, Department of Pedodontics and Preventive Dentistry, Krishnadevaraya College of Dental Sciences, Bangalore, India
Email: dr.akshata27@gmail.com

INTRODUCTION

Dental caries is a term that refers to an infectious microbial ailment of the teeth that results in the localized dissolution and destruction of calcified tissues.[1] Reversible white spot lesions are the initial visible indications of caries on the tooth's surface. These lesions are followed by brownish discoloration, which may ultimately result in cavitation. This dentinal caries has the potential to disseminate to the pulp, leading to pulp inflammation and pulpitis, if left untreated. The inflammation that is generated within the rigid, constricted pulp chamber will eventually cause the pulp tissue to necrotize as a consequence of the extreme, ongoing pain.[2] Caries results in the destruction of nearly the entire crown, leaving only the root and minimal to no crown, which leads to extraction of the tooth.[3] The primary concerns in pediatric dentistry are the loss of the primary molar and the consequent loss of space. One method for addressing basic tooth decay symptoms is pulp therapy. A pulpectomy is the procedure utilized to restore primary teeth while maintaining natural space. This technique can be performed on single- or multi-rooted teeth that exhibit furcal involvement.[4]

The traditional method of hand instrumentation can result in canal perforations, poor cleaning and shaping, instrument failure, and prolonged chair time for children. The use of rotary instruments has significantly increased in the field of endodontics. Barr et al. carried out the first investigation to demonstrate the application of NiTi rotary files in primary molars. For permanent teeth, they put out the same biomechanical preparation ideas.[5] With fewer appointments, Rotary has increased workability because a child's behavior is significantly impacted by the length of each appointment.[6] Hence, an increasing number of experts are investigating the benefits of rotary endodontics in modern practice.[7] The creation of novel rotary instruments is necessary to improve primary tooth shape and root canal cleaning performance.[8]

Specialized pediatric rotary files with additional modifications, like gold-treated files, heat-treated files with a TiO coating, and files with CM, are now readily accessible for use in primary teeth that have a length from 16 to 18 mm.[9] With a total length of 16 mm, the Kedo-S file was designed especially for primary tooth canal instrumentation. The Kedo-S pediatric rotary files have a variable taper that facilitates coronal expansion and secures apical preparation.[10] Kids-e-dental has introduced new rotary filing systems, notably the Kids-e-dental rainbow files. To make Kids-e-Files flexible and long-lasting, a nickel-titanium alloy is heat-treated and surface-treated. They can navigate through curved root canals due to their triangular cross section.

Hence, we performed this in vivo and in vitro study to compare the efficacy of these new rotary file systems in pediatric dentistry. The purpose of this study was to examine the primary molars' obturation quality following cleaning and shaping with two different pediatric dentistry rotary files. Also to evaluate and compare the intercanal 3D shape, debris index and smoothness of the prepared canals using these different pediatric rotary file systems.

MATERIALS AND METHODS

Study design and ethical consideration

This in vitro and in vivo experimental study was conducted in department of pediatric and preventive dentistry, Krishnadevaraya College of Dental Sciences, Bangalore after obtaining ethical clearance from the ethical board committee. A total of 25 children were included in our study after obtaining the informed consent from the parents or guardians. Among these 25 children, 10 were selected for invitro study and 15 were selected for invivo study. The selection criteria for invitro study included subjects indicated for serial extraction of primary canines with full root length and no underlying root resorption or pathologies.[11] The selection criteria for invivo study included decayed mandibular primary molars with (a) pulpal involvement without sinus tract, (b) closed root apices, and (c) without any pathologic/ physiologic root resorption. Children allergic to any materials used for the treatment, or with limited cooperative ability, children with any systemic diseases and special health care need children were excluded from the study.[12]

Sample Size Estimation
For In-vitro Study

$$n = \frac{Z^2_{1-\alpha/2}\left[P_1(1-P_1)+P_2(1-P_2)\right]}{d^2}$$

In this study, the probability of debris absence was assessed using two file systems. The Kids-e-Dental Rainbow files demonstrated a probability (P1) of debris absence of 1.00, while the Manual Hand files showed a lower probability (P2) of 0.33. The population risk difference (d) between the two file systems was calculated to be 0.67. The study was conducted with a confidence level of 95% (1-α = 0.95) and a statistical power of 0.80 to ensure reliable results. A margin of error of 0.10 was set to allow for precise estimates within the acceptable range. These parameters were chosen to robustly evaluate and compare the performance of the two file systems in ensuring debris absence.

For In-vivo Study

$$n = \frac{2{s_p}^2\left[Z_{1-\alpha/2}+Z_{1-\beta}\right]^2}{\mu_d^2}$$

$$s_p^2 = \frac{s_1^2+s_2^2}{2}$$

Where,

s_1^2 : Standard deviation in the first group

s_2^2 : Standard deviation in the second group

μ_d^2 : Mean difference between the samples

α : Significance level

1- β : Power

The study evaluated the working time efficiency of two file systems: Kids-e-Dental Rainbow files and Manual Hand files. The standard deviation for the Kids-e-Dental Rainbow file group was 2.5, while the standard deviation for the Manual Hand file group was slightly higher at 3.0. The mean difference in working time between the two groups was calculated to be 5.0, indicating a noticeable disparity in their performance. A significance level of 0.05 was set to determine statistical significance, and the study was designed with a power of 0.80 to ensure adequate sensitivity for detecting true differences between the groups. These parameters were established to provide a robust framework for comparing the working time efficiency of the two file systems.

Clinical procedure: In-vitro study

A total of 9 primary canines indicated for serial extraction were included in the study according to the inclusion and exclusion criteria. A No. 4 round carbide bur was used on a high-speed hand piece for decoronation of the tooth. No.10 size K file was used to determine the patency of the canals. The working length was kept 1 mm short of the apical foramen after measuring from the radiograph. These subjects were

divided into 3 groups. Group 1 – Kids-e-dental rainbow files, Group 2 – Kedo SG blue files, and Group 3 – Manual hand filing. Canals were prepared with files according to the specifications given in each group. Irrigation with 5 mL saline was performed twice. The root canal internal 3D shape was determined by intracanal impressions using putty impression material. Material was pressed over the floor of the pulp chamber. The putty material was kneaded by hand to facilitate the material to enter into the canal. This putty material also acted as support for the coronal part of the impression facilitating its removal. Impression was removed after it was set and it was observed within 24 hours.[13]

The prepared teeth in each group were sectioned and these sectioned teeth were studied to determine the preparation efficacy of files using microscopic images. The smoothness of the prepared canals and the debris remaining in the canal of each third of the sectioned was evaluated using debris index criteria and smoothness index criteria (Jome Joju et al).[11] (Fig 1).

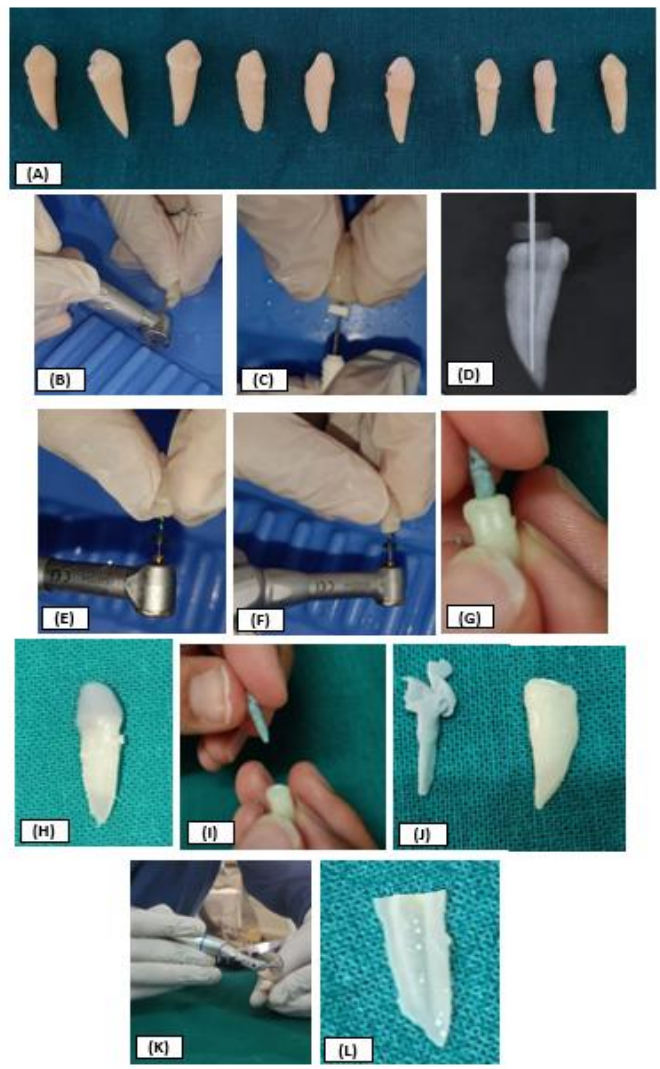

Fig 1: (A) extracted canines, (B) Access cavity preparation, (C) intial filing, (D) working length determination, (E) Group 1 filing, (F) Group 2 filing, (G) Kneading the impression, (H) Impression inserted, (I) Removal of the impression material, (J) removed impression, (K) sectioning of tooth, (L) Sectioned tooth.

Invivo study

A total of 15 subjects were taken for the study according to the inclusion and exclusion criteria after obtaining participant information sheet (PIS), informed consent and child accent form. After applying topical anesthesia, inferior alveolar nerve block was administered for the selected mandibular molars. A rubber dam was placed for the isolation and an access opening was performed using round carbide bur (no. 4) at high speed. Initial pulp extirpation was done using K-files followed by copious irrigation of the pulp chamber that was performed twice using 5ml normal saline. Radiographic working length was determined using Ingle's method.

Canals were prepared with files according to the specifications given in each group. Irrigation with 5 mL saline was done which was repeated after each filing. Instrumentation timing was recorded with stopwatch which was started when using rotary files and stopped after the preparation was completed. Sterile paper points were used to dry the canals and obturation was done with metapex. Radiographs were taken post obturation and the quality of the obturation was assessed (Fig 2).[14]

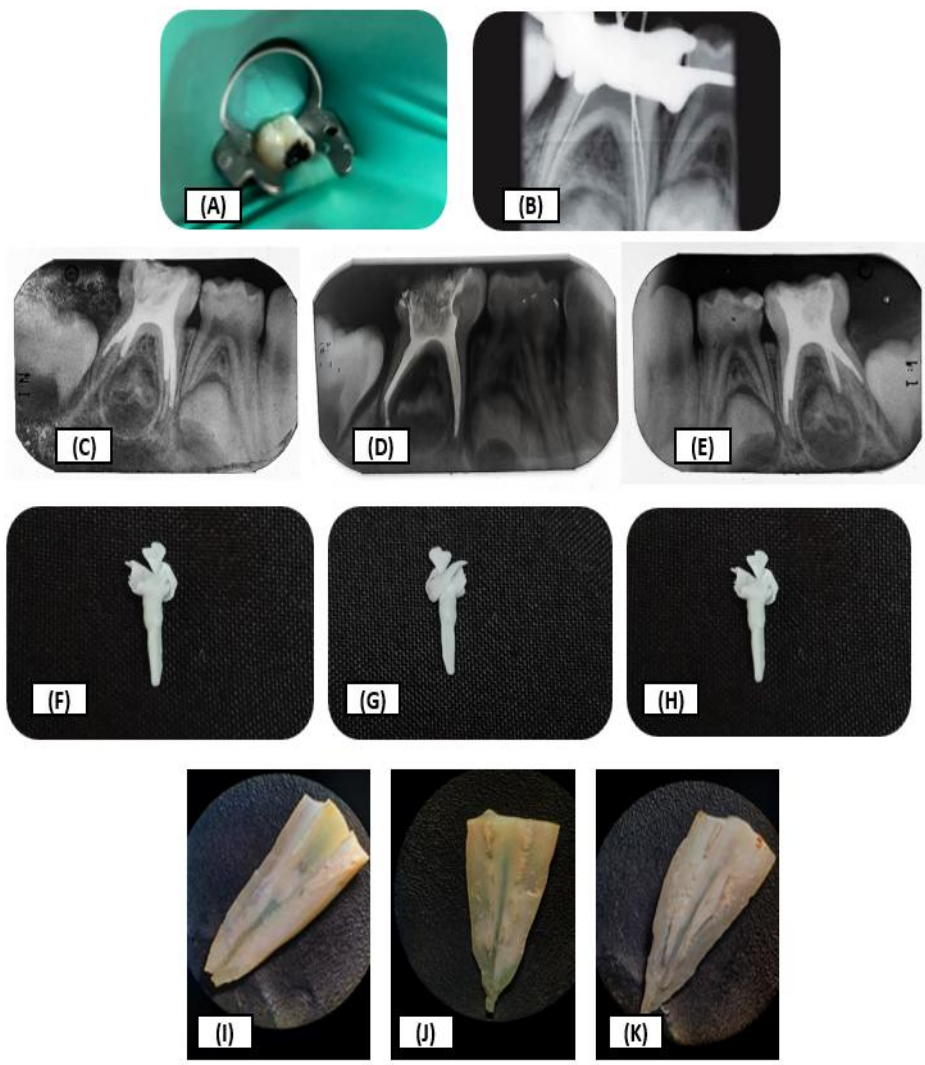

Fig 2: (A) isolation of tooth, (B) working length determination, (C) obturation post kids-e-dental filing, (D) obturation post Kedo SG blue filing, (E) obturation post hand filing, (F,G,H) Canal impressions of respective groups, (I,J,K) Microscopic Sectioned teeth evaluation of respective group.

Criteria analysed

Debris scoring criteria

The sectioned tooth is divided into three regions: the apical third, middle third, and coronal third. Each of these regions is carefully examined to identify the presence of debris. The findings are categorized based on the extent of debris in each region. A score of '+' is assigned if debris is observed in one small area within a particular region (apical, middle, or coronal). If debris is noted in 2-3 areas within the same region, it is recorded as '++'. When debris is present in more than three areas of the region, it is denoted as '+++'. Conversely, a score of '0' is given when no debris is identified in the examined region. This classification facilitates a structured assessment of debris distribution within the tooth sections.[11]

Smoothness index

The sectioned tooth is divided into three parts: apical third, middle third, and coronal third. Each part is carefully examined for surface characteristics, specifically focusing on the presence of roughness based on the presence of dentinal flutes. The evaluation involves determining whether the surface in each third is smooth or rough. Smoothness is recorded as "present" when the surface lacks prominent dentinal flutes, indicating a uniform texture. In contrast, it is noted as "absent" when dentinal flutes are distinctly observed, signifying a rough surface. This systematic analysis ensures a detailed assessment of surface texture in the sectioned tooth.[11]

Canal Taper

The taper of the prepared canal was evaluated based on its conical shape. An acceptable good taper was defined as a canal exhibiting a uniform conical shape, ensuring proper preparation and adequate tapering. Conversely, an unacceptable taper was characterized by a poorly conical or cylindrical shape, indicating inadequate preparation or suboptimal canal shaping. This classification was used to assess the quality of canal tapering achieved during the procedure.

Instrumentation timing

The working time for each group was measured using a stopwatch and recorded in minutes as per the clinical procedure outlined in the in vivo study. This ensured precise and consistent timing of the procedures, enabling a reliable comparison between the groups.[12]

Obturation quality scoring

The extent of canal fill was evaluated and graded from A to D based on specific criteria. Grade A indicated that less than one-half of the canal was obturated, while Grade B represented a fill greater than one-half but less than optimal. Grade C denoted an optimal fill, signifying complete and satisfactory obturation of the canal. Grade D was assigned when there was extrusion of material beyond the apex. Additionally, the presence of voids within the canal was recorded using a binary system: "+" for the presence of voids and "−" for their absence. This grading system provided a comprehensive assessment of the quality and extent of canal obturation.[15]

Statistical Analysis

Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) for Windows, Version 22.0, released in 2013 by IBM Corp., Armonk, NY. Descriptive analysis of all explanatory and

outcome parameters was conducted, utilizing mean and standard deviation for quantitative variables and frequency and proportions for categorical variables. The Chi-Square Test was employed to compare the Debris Index Scores, Smoothness Index Scores, 3D Taper, and Obturation Quality grades across the three groups. To compare the mean working time between the three groups, a one-way ANOVA test was conducted, followed by Tukey's post hoc test for pairwise comparisons. The level of significance for all statistical tests was set at $P<0.05$.

RESULTS

Debris scoring index

In the Coronal Region, rotary instrumentation groups (Group 1 and 2) showed predominantly with No Debris (100%) as compared to hand filing group which showed Debris presence in one small area in 66.7% of the samples. In Middle Region, Group 1 - predominantly with No Debris (66.7%), Group 2 - Debris in one small area in 66.7% of samples and Group 3 witnessed with Debris presence in 2-3 areas in 66.7% of the samples. In Apical Region, Group 1 - predominantly with Debris in one small area (66.7%), Group 2 - an equal distribution of Debris in one small area, in 2-3 areas and also in > 3 areas in 33.3% of samples and Group 3 - witnessed predominantly with Debris presence in 2-3 areas in 66.7% of the samples (Table 1). However, there was no association between Debris Index Scores between 3 groups at different thirds of tooth. The statistical difference was insignificant.

Table 1: Comparison of Debris Index scores between 3 groups at different thirds of tooth using Chi Square Test

Region	Debris Scores	Group 1		Group 2		Group 3		p-value
		n	%	n	%	n	%	
Coronal	Debris Absent	3	100.0%	3	100.0%	1	33.3%	0.08
	Debris noted in one small area	0	0.0%	0	0.0%	2	66.7%	
Middle	Debris Absent	2	66.7%	1	33.3%	0	0.0%	0.17
	Debris noted in one small area	1	33.3%	2	66.7%	1	33.3%	
	Debris noted in 2-3 areas	0	0.0%	0	0.0%	2	66.7%	
Apical	Debris noted in one small area	2	66.7%	1	33.3%	0	0.0%	0.41
	Debris noted in 2-3 areas	1	33.3%	1	33.3%	1	33.3%	
	Debris noted in > 3 areas	0	0.0%	1	33.3%	2	66.7%	

Smoothness Index

The Smoothness Index Scores showed a significant difference in Coronal & Middle region between 3 groups at $p=0.04$, in which Group 3 showed significantly highest distribution of Roughness (100%) as compared to Group 1 & Group 2, which showed Predominantly Smooth surface in 100% & 66.7% samples respectively. However, Apical region did not demonstrate any significant difference in the Smoothness Index scores between 3 groups (Table 2).

Table 2 - Comparison of Smoothness Index scores between 3 groups at different thirds of tooth using Chi Square Test

Region	Smoothness Index	Group 1		Group 2		Group 3		p-value
		n	%	n	%	n	%	
Coronal	Smooth	3	100.0%	2	66.7%	0	0.0%	0.04*
	Rough	0	0.0%	1	33.3%	3	100.0%	
Middle	Smooth	3	100.0%	2	66.7%	0	0.0%	0.04*
	Rough	0	0.0%	1	33.3%	3	100.0%	
Apical	Smooth	1	33.3%	0	0.0%	0	0.0%	0.33
	Rough	2	66.7%	3	100.0%	3	100.0%	

* - Statistically Significant

Canal Taper

The Canal Taper showed a significant difference between 3 groups at p=0.04, in which Group 3 showed significantly highest distribution of Unacceptable Taper (100%) as compared to Group 1 & Group 2, which showed Predominantly Acceptable Taper in 100% & 66.7% samples respectively (Table 3).

Table 3 - Comparison of Canal Taper between 3 groups at different thirds of tooth using Chi Square Test

Region	Canal Taper	Group 1		Group 2		Group 3		p-value
		n	%	n	%	n	%	
3D Shape	Acceptable	3	100.0%	2	66.7%	0	0.0%	0.04*
	Unacceptable	0	0.0%	1	33.3%	3	100.0%	

* - Statistically Significant

Instrumentation Time

The mean Working Time showed a statistically significant difference between 3 groups at p<0.001. Multiple comparisons of mean differences between groups revealed that Group 3 showed significantly higher mean Working time as compared to Group 1 & Group 2 and the mean differences were statistically significant at p<0.001 respectively. However, the mean working time between Group 1 and Group 2 did not demonstrate a statistically significant difference [p=0.93] (Table 4).

Table 4 - Comparison of mean Working Time (mins) between 3 groups using One-way ANOVA Test followed by Tukey's post hoc Test

Groups	N	Mean	SD	Min	Max	p-value [a]	Sig. Diff	p-value [b]
Group 1	5	20.40	2.61	18	24	<0.001*	1 vs 2	0.93
Group 2	5	20.80	1.30	19	22		1 vs 3	<0.001*
Group 3	5	28.20	0.84	27	29		2 vs 3	<0.001*
* - Statistically Significant								

Obturation Quality

The Obturation Quality in all 3 groups showed predominantly with Grade C (66.7%), which was followed by Grade B in Group 1 & Group 3 (33.3%) and Grade D in Group 2 (33.3%). However, there was no statistically significant difference observed between 3 groups with respect to Obturation Quality [p=0.56] (Table 5).

Table 5 - Comparison of Obturation Quality Grades between 3 groups using Chi Square Test

Parameter	Grades	Group 1	Group 2			Group 3		P-value
		n	%	n	%	n	%	
Obturation	Grade B	1	33.3%	0	0.0%	1	33.3%	0.56
	Grade C	2	66.7%	2	66.7%	2	66.7%	
	Grade D	0	0.0%	1	33.3%	0	0.0%	

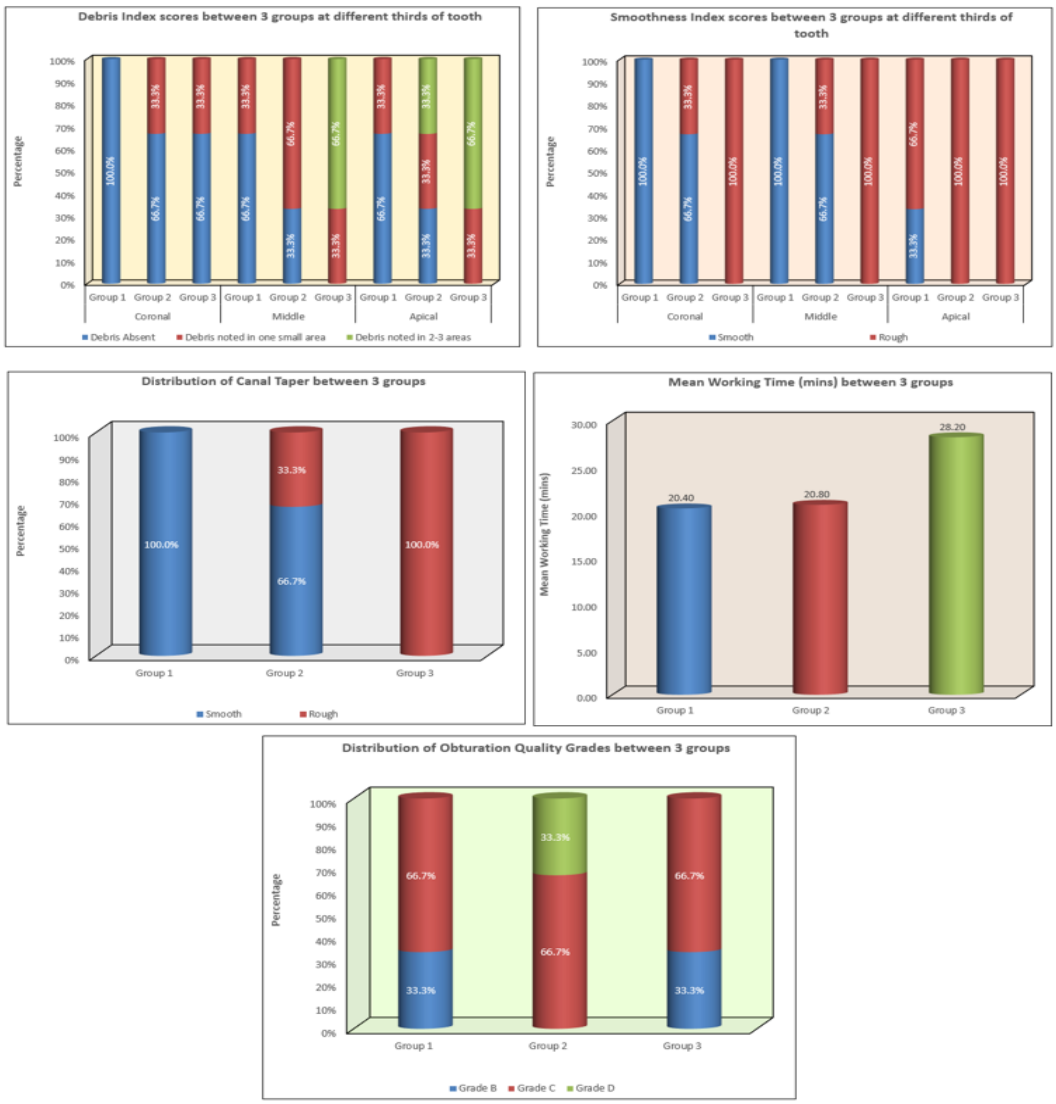

Fig 3: Bar charts depicting various results

DISCUSSION

The objectives of our investigation were to evaluate the quality of obturation in primary molars that after cleaning and shaping using two distinct pediatric dentistry rotary files. Additionally, to assess and compare the intercanal 3D geometry, debris index, and smoothness of the canals that have been prepared using various pediatric rotary file systems. The standardisation of the study was achieved by keeping only the primary canines with similar height in case of in vitro study and considering only the primary mandibular molars for in vivo study. Also, only the Metapex obturating material was used in all the cases to maintain the standardization throughout the invivo study.

The early exfoliation of a primary tooth is a critical concern in the field of pediatric dentistry, as the preservation of primary teeth is essential for the correct integrity of the dental arch and facial tissues. Additionally, it acts as a guide for the sucedaneous permanent teeth's eruption.[16] Root canal therapy aims to completely seal a thoroughly cleaned and sterilized root canal system.[9] Mechanical instrumentation is

associated with successful pulpectomy treatment. Smooth canal preparation devoid of debris will benefit to deliver better obturation and apical seal. The traditional method for preparing root canals in primary teeth involves the manual instrumentation of endodontic broaches and hand files, which requires a significant amount of time. The main issue with hand instrumentation for deciduous teeth is that it takes longer to prepare, which makes children less cooperative.[17]

Rotary instrumentation has increasingly led to faster, safer, and higher-quality canal preparation. Although the rotary files used had a 0.04 taper, which was similar to the 0.02 taper of the conventional files, rotary files have twice the taper of K files, and this predetermined shape is marked in the root canal during instrumentation, resulting in more conical canals than conventional files. Higher conicity enhances material insertion and condensation. This form holds more material inside the canal than a cylindrical shape, preventing the filling material from extruding at the apex. This is significant since clinical research studies examining filling quality in pulpectomies, regardless of material, revealed great success rates with flush and underfilled canals. Regardless of the materials used, the success rate reduced dramatically when overfilling occurred. Other factors that can influence treatment success include past pulp disease and resorption. Another important aspect while working with rotary files is that, due to their conicity, exceeding the working length should be avoided. Although passing this length will result in an overfill due to the apical orifice being larger than when using manual files, it has been demonstrated statistically that optimally filled and overfilled primary root canals had a higher success rate than underfilled canals.[13]

Barr et al gave the merits and demerits about the use of rotary files in primary teeth. These authors consider that the use of rotary technique was more effective way to debride the uneven walls of primary root canals and to provide a dense fill. Silva et al. did not find any difference in the cleaning capacity between rotary system and manual instrumentation techniques and concluded that there was reduction in the instrumentation time on using the rotary technique.[18] A study by Crespo et al., demonstrated that, the use of rotary files in deciduous teeth were more efficient in both preparation time and root canal shaping, facilitating a greater quality of obturation of the root canal.[13]

According to Kuo et al., new NiTi rotary files designed exclusively for primary teeth might be more beneficial. The continuous taper of the NiTi-TiO pediatrics rotary files facilitates coronal expansion and straight-line access. This gentle taper also aids in appropriate canal preparation and prevents excessive instrumentation of the root surface's inner wall.[9] Recently, a unique pediatric endodontic file system called Kedo-SG Blue (Reeganz Dental Care Pvt. Ltd., India) was introduced. It is composed of three Ni-Ti rotary files that have been heat-treated and coated with titanium oxide. These files have a total length of 16 mm and a working length of 12 mm. Each file is referred to by the labels D1, E1, and U1, accordingly. The varied taper of these files corresponds to their application in deciduous teeth. Deciduous molars with narrow canals can be treated using a D1 file, which has a 0.25 mm tip diameter. Wider molar canals can be treated using an E1 file with a 0.30 mm tip diameter. The U1 file's tip diameter is 0.40, and it is mostly recommended for primary incisor teeth.[10] Kids-e-Files are constructed of a nickel-titanium alloy that has been heat-treated and surface-treated to provide flexibility and durability. They have a triangular cross section, which allows them to negotiate curved root canals. The rainbow-colored Kids-e-Files are intended to improve cutting efficiency, remove debris, and ensure safety. In our study, we compared the Kedo SG Blue files, Kids-e-dental rainbow files, and manual hand filing for the efficacy in optimal canal preparation in pulpectomy procedures of primary teeth.

According to a study by Jome Joju et al., Pedoflex files have the best capacity for canal preparation with less debris and better smoothness followed by Pro AF Baby Gold and Kedo SG Blue file systems, and

preparations using Pedoflex may yield better treatment outcomes than those using Pro AF Baby Gold and Kedo SG Blue.[11] When we compared the samples prepared by different file system and analyse the score based on the criterias, Kids-e-dental file system showed least debris formation followed by kedo SG blue and most amount of debris is noted in samples prepared by manual filing. Smoothness index showed that kids-e-dental showed the smoothest canal preparation followed by kedo SG blue and most rough preparation was noted in manual preparation. Manual filing showed significantly highest distribution of Unacceptable Taper (100%) as compared to kids-e-dental and kedo SG blue, which showed Predominantly Acceptable Taper in 100% & 66.7% samples respectively.

A study by Shruti et al., stated that Kedo-SG blue rotary files required the least amount of time to instrument, followed by Baby Gold ("Pro AF") files, while "K-Flex" files took the greatest time.[14] In our study the mean working time between Kids-e-dental rainbow files and Kedo SG blue, did not demonstrate statistically significant difference. This infer that Kids-e-dental rainbow files are as efficient as Kedo SG blue. A study by S. Sruthi et al demonstrated Kedo-SG blue pediatric rotary file showed a marked reduction in instrumentation time, followed by Kedo-SH pediatric hand files and reciprocating hand K-files.[19] Similarly, P. Priyadarshini et al in her study proved that a marked reduction in instrumentation time and superior quality of obturation was observed with rotary Kedo-SG Blue file system followed by Kedo-SH, Kedo-S and hand K-files.[20] In our study the Obturation Quality in all 3 groups showed predominantly with optimal fill (66.7%), which was followed by Grade B in kids-e-dental & manual filing (33.3%) and extrusion in Kedo SG blue (33.3%), however, it was not statistically significant. As per our knowledge this study is one of the firsts to compare the new Kids-e-dental rainbow files to other rotary files. Our studies have demonstrated that these new files are as good as Kedo SG blue files.

The current study had few drawbacks which includes the following. (a) Intraoral periapical radiography was used exclusively for a two-dimensional assessment of the obturation quality. It was however compensated, since we assessed the intracanal 3D shape invitro to study the canal taper. (b) To evaluate the clinical and radiographic success of the pulpectomy procedure carried out utilizing various instrumentation techniques, long-term follow-up is necessary which we could not carry out as the cases are yet to be evaluated further. (c) A reduced sample size was another drawback as this study consisted of both invitro and invivo studies. Our study could be considered as a baseline to further evaluate the parameters of efficient canal preparation by different new rotary files that have been introduced in pediatric dentistry which larger sample size.

CONCLUSION

After analyzing the debris and smoothness index score using the criteria, we can conclude that Kids-e-dental files provide the best canal preparation with less debris and better smoothness followed by Kedo SG blue and manual filing. Although the working time of both files were similar, the preparations with Kids-e-dental after analyzing the results could provide a better treatment result compared to Kedo SG Blue and manual preparation. Further studies with larger sample sizes are necessary to evaluate the parameters on the larger scales.

FINANCIAL SUPPORT AND SPONSORSHIP

Nil

CONFLICTS OF INTEREST

There are no conflicts of interest

REFERENCES

1. Heymann HO, Swift EJ, Ritter AV. Sturdevant's Art and Science of Operative Dentistry.(6th edn), St. Louis: Elsevier Mosby, USA. 2013:624-88.
2. Holt R, Roberts G, Scully C. Dental damage, sequelae, and prevention. BMJ. 2000 Jun 24;320(7251):1717-9.
3. Chin JR, Kowolik JE, Stookey GK. Dental caries in the child and adolescent. McDonald and Avery's Dentistry for the Child and Adolescent,. 2015 Aug 10:155-76.
4. Hargreaves KM, Berman LH. Cohen's Pathways of the Pulp Expert Consult - E-Book. Mosby; 2015.
5. Barr ES, Kleier DJ, Barr NV. Use of nickel-titanium rotary files for root canal preparation in primary teeth. Pediatric dentistry. 2000 Jan 1;22(1):77-.
6. Lenchner V. The effect of appointment length on behavior of the pedodontic patient and his attitude toward dentistry. Journal of dentistry for children. 1966 Mar;33(2):61-74.
7. Dey B, Jana S, Chakraborty A, Ghosh C, Roy D. A comparison of Ni-Ti rotary and hand files instrumentation in primary teeth–a review article. Int J Oral Health Med Res. 2016;3(2):59-62.
8. Govindaraju L, Jeevanandan G, Subramanian EM. Knowledge and practice of rotary instrumentation in primary teeth among indian dentists: A questionnaire survey. Journal of International Oral Health. 2017 Mar 1;9(2):45-8.
9. Kohli A, Chhabra J, Sharma K, Katyayan R, Bhatnagar P, Sharma A. Comparative Evaluation of Instrumentation Time and Quality of Obturation amongst Pediatric Rotary Endodontic System: An In Vivo Study. International Journal of Clinical Pediatric Dentistry. 2023 Mar;16(2):338.
10. JeevananDan G. Kedo-S paediatric rotary files for root canal preparation in primary teeth–Case report. Journal of clinical and diagnostic research: JCDR. 2017 Mar;11(3):ZR03.
11. Jome J, Saseendran A, Sudhakar M, Nagar P, Sahana B, TH NF. A Novel Index to Analyze Pediatric Rotary File Systems. RGUHS Journal of Dental Sciences. 2023;15(4).
12. Juliet S, Jeevanandan G, Govindaraju L, Ravindran V, Subramanian EM. Comparison between three rotary files on quality of obturation and instrumentation time in primary teeth− A double blinded randomized controlled trial. Journal of Orofacial Sciences. 2020 Jan 1;12(1):30-4.
13. Crespo S, Cortés O, García C, Pérez L. Comparison between rotary and manual instrumentation in primary teeth. Journal of Clinical Pediatric Dentistry. 2008 Jul 1;32(4):295-8.
14. Shetty B, Singh R, Patil V, Tirupathi SP, Nene K, Rathi N. Comparative Evaluation of Single Rotary File System and Sequential Multi-file Rotary Systems on Time for Biomechanical Preparation and Obturation Quality in Single-visit Pulpectomy Protocol: A Double-blind Randomized Clinical Trial. International Journal of Clinical Pediatric Dentistry. 2023 Nov;16(Suppl 3):247.
15. Khubchandani M, Baliga MS, Rawlani SS, Rawlani SM, Khubchandani KM, Thosar N. Comparative evaluation of different obturation techniques in primary molars: an in vivo study. European Journal of General Dentistry. 2017 Jan;6(01):42-7.
16. Fuks AB, Papagiannoulis L, Duggal MS. Pulpotomy in primary teeth: review of the literature according to standardized assessment criteria. European archives of paediatric dentistry. 2006 Jun;1:64-72.
17. Govindaraju L, Jeevanandan G, Subramanian EM. Clinical evaluation of quality of obturation and instrumentation time using two modified rotary file systems with manual instrumentation in primary teeth. Journal of clinical and diagnostic research: JCDR. 2017 Sep;11(9):ZC55.
18. Silva LA, Nelson-Filho P, Leonardo MR, Tanomaru JM. Comparison of rotary and manual instrumentation techniques on cleaning capacity and instrumentation time in deciduous molars. Journal of dentistry for children. 2004 Jan 1;71(1):45-7.
19. Sruthi S, Jeevanandan G, Govindaraju L, Subramanian E. Assessing quality of obturation and

instrumentation time using Kedo-SG blue, Kedo-SH, and reciprocating hand K-files in primary mandibular molars: A double-blinded randomized controlled trial. Dental Research Journal. 2021 Jan 1;18(1):76.

20. Priyadarshini P, Jeevanandan G, Govindaraju L, Subramanian EM. Clinical evaluation of instrumentation time and quality of obturation using paediatric hand and rotary file systems with conventional hand K-files for pulpectomy in primary mandibular molars: a double-blinded randomized controlled trial. European Archives of Paediatric Dentistry. 2020 Dec;21:693-701.

Published by MM Publishers
https://www.mmpubl.com/ijpedorehab